APPENDIX D

Noise Report

MOUNTAIN VIEW HIGH SCHOOL FIELD LIGHTING PROJECT NOISE AND VIBRATION ASSESSMENT

Mountain View, California

April 7, 2020

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INTRODUCTION

The Project proposes to add lighting and an upgraded public address (PA) system to the existing track and athletic fields at Mountain View High School allowing the school to host athletic and other events at night. The PA system would be used for sporting events, marching band, and school activities during daytime hours, and a select amount of nighttime events. The use of lights and PA systems would be limited to no later than 10:00 p.m. after the conclusions of varsity and junior varsity interscholastic competitions. Typical competitions would end by 8:30 p.m. After installation of the field lighting and upgraded PA system, Mountain View High School expects an average attendance at football games of 1,500, with up to 2,200 attendees expected for rivalry or homecoming games. An approximate attendance of up to 500 people is expected for non-football sporting events, marching band activities, and other special events. Mountain View High School currently uses temporary lights for two to five football games per year.

This report evaluates the project's potential to result in significant environmental noise or vibration impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into two sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; and, 2) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents measures, where necessary, to mitigate the impacts to a less-than-significant level.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA)*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dB lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dB with open windows. With standard construction and closed windows in good condition, the noise attenuation factor is around 20 dB for an older structure and 25 dB for a newer dwelling. Sleep and speech interference is therefore of concern when exterior noise levels are about 57 to 62 dBA DNL with open windows and 65 to 70 dBA DNL if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, DNL or L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous or frequent intermittent vibration levels produce. The guidelines in Table 3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to cause damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, that may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table 3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk to damage. Most buildings are included within the categories ranging from "Historic and some old buildings" to "Modern industrial/commercial buildings". Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

TABLE 3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Background

The State of California and the City of Mountain View have established regulatory criteria that are applicable in this assessment. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State CEQA Guidelines. The CEQA guidelines are used in this analysis to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

(a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies;

(b) Generation of excessive groundborne vibration or groundborne noise levels; or

(c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise levels.

Checklist items (a) and (b) are applicable to the proposed project. The project is not located within two miles of a public airport or in the vicinity of a private airstrip and would not expose people

residing or working in the project area to excessive aircraft noise levels; therefore, item (c) is not carried further in this analysis.

City of Mountain View General Plan. Chapter 7 of the City of Mountain View's 2030 General Plan provides noise guidelines for the year 2030, which is shown in Table 7.1, and establishes the following goals and policies that would be applicable to the proposed project:

Goal NOI-1: Noise levels that support a high quality of life in Mountain View.

POLICY NOI 1.1: Land use compatibility. Use the Outdoor Noise Acceptability Guidelines as a guide for planning and development decisions (Table 7.1).

POLICY NOI 1.3: Exceeding acceptable noise thresholds. If noise levels in the area of a proposed project would exceed normally acceptable thresholds, the City shall require a detailed analysis of proposed noise reduction requirements to determine whether the proposed use is compatible. As needed, noise insulation features shall be included in the design of such projects to reduce exterior noise levels to meet acceptable thresholds, or for uses with no active outdoor use areas, to ensure acceptable interior noise levels.

POLICY NOI 1.4: Site planning. Use site planning and project design strategies to achieve the noise level standards in NOI 1.1 (Land use compatibility) and in NOI 1.2 (Noise-sensitive land uses). The use of noise barriers shall be considered after all practical design-related noise measures have been integrated into the project design.

POLICY NOI 1.5: Reduce the noise impacts from major arterials and freeways.

POLICY NOI 1.6: Sensitive uses. Minimize noise impacts on noise-sensitive land uses, such as residential uses, schools, hospitals, and child-care facilities.

POLICY NOI 1.7: Stationary sources. Restrict noise levels from stationary sources through enforcement of the Noise Ordinance.

Table 7.1 Outdoor Noise Environment Guidelines

Land Use Category	Community Noise Exposure in Decibels (CNEL) Day/Night Average Noise Level in Decibels (Ldn)						
	55	60	65	70	75	80	85
Residential–Single-Family, Duplex, Mobile Homes							
Residential–Multi-Family Transient Lodging–Motels, Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters, Sports Arenas, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

NORMALLY UNACCEPTABLE
New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development clearly should not be undertaken.

Source: State of California General Plan Guidelines, 2003.

City of Mountain View Code. The City's Code provides provisions for construction hours and allowable noise levels for stationary equipment. The portions of the Code that are relevant for this project are as follows:

Section 8.70.1 Construction noise.

a. **Hours of construction**. No construction activity shall commence prior to 7:00 a.m. nor continue later than 6:00 p.m., Monday through Friday, nor shall any work be permitted on Saturday or Sunday or holidays unless prior written approval is granted by the building official. The term "construction activity" shall include any physical activity on the construction site or in the staging area, including the delivery of materials. In approving modified hours, the building official may specifically designate and/or limit the activities permitted during the modified hours.

b. **Modification.** At any time before commencement of or during construction activity, the building official may modify the permitted hours of construction upon twenty-four (24) hours written notice to the contractor, applicant, developer or owner. The building official can reduce the hours of construction activity below the 7:00 a.m. to 6:00 p.m. time frame or increase the allowable hours.

c. **Sign required.** If the hours of construction activity are modified, then the general contractor, applicant, developer or owner shall erect a sign at a prominent location on the construction site to advise subcontractors and material suppliers of the working hours. The contractor, owner or applicant shall immediately produce upon request any written order or permit from the building official pursuant to this section upon the request of any member of the public, the police or city staff.

d. **Violation.** Violation of the allowed hours of construction activity, the building official's order, required signage or this section shall be a violation of this code. (Ord. No. 13.10, § 15, 10/26/10)

Section 21.26 Stationary equipment noise.

a. No person shall own or operate on any property any stationary equipment, such as, but not limited to, air compressors, equipment for swimming pools, spas, or air conditioners, which produces a sound level exceeding 55 dBA (50 dBA during the night, 10 p.m. to 7 a.m.) when measured at any location on any receiving residentially used property, said measurement to utilize a sound level meter equal to or better than an ANSI Standard S 1.4-1971 Type 2 noise level meter.

b. Any plans submitted for building, plumbing, electrical or mechanical/heating permit for any stationary equipment shall be accompanied by documentation of the equipment noise level when available and by noise mitigating devices or buffers appropriate to achieve the above noise limit. Initial granting of a permit for such equipment shall not affect the obligation of each person owning or operating such equipment for continued compliance with these noise level requirements.

c. Operation of any equipment, as specified in this section, above the 55 dBA limit (50 dBA nighttime), may occur only if the owner or operator has obtained a conditional use permit. A permit to operate equipment which exceeds the limit may be granted by the zoning administrator only if it has been demonstrated that such operation will not be detrimental to the health, safety, peace, morals, comfort or general welfare of residents subjected to such noise. The manner of obtaining said permit and the rules governing its issuance and revocation shall be as specified in Mountain View City Code Sec. 36.43 and following, all relating to the issuance of conditional use permits. (Ord. No. 11.81, 8/31/81).

Mountain View Los Altos Union High School District Board. The Board of Trustees of the Mountain View Los Altos Union High School District has established Board Policy 7325 and Administrative Regulations 7325 to guide the use of stadium lights and public address systems. The policy and regulation are summarized in Table 4:

TABLE 4 Proposed Use of the Field Lights and Public Address System

Proposed Use of Field	Use of Field Lights	Use of Public Address System
Sports Games	A total of up to 25 nights of varsity/junior varsity interscholastic competition per annual season, comprised of the annual seasons for football (five games), boy's and girls' soccer (10 games), and boy's and girls' lacrosse (10 games), concluding by 10:00 PM at the latest[1]	Yes (play-by-play commentary only permitted during football games). All other athletic competitions shall limit the use of the public address systems to announcements, warm-up music or similar uses without running commentary.
Sports Practices	Monday through Friday, concluding by 8:30 PM. Not during weekend nights unless under unusual circumstances approved by the Superintendent or designee	No
Marching Band Practice	Two weeknights per week between August and November; one practice concluding by 8:00 PM and one practice concluding by 6:30 PM.[2]	Yes
Marching Band Performance	Five football competitions, commencement, and up to three special evening events.	Yes
Special Events	Commencement and up to three special evening events per year, concluding by 9:00 PM.	Yes
Holiday Use	The stadium field lights will not be used on school holidays, or in the period of time between commencement ceremonies and the beginning of sports practice for the fall season, as permitted by California Interscholastic Federation (CIF) rules.[4]	Use would be limited by all provisions described in BP 7325 policy and shall require prior approval by the superintendent or designee. Use of public address systems during holidays shall not begin prior to 10:00 AM[3]; shall be limited to necessary and occasional announcements, and occasional music played at volumes low enough not to interfere with ordinary conversation at the school site's boundary lines; and shall end by 2:00 PM.

[1] Football competitions would typically end by 10:00 PM; all other competitions would typically end by 8:30 PM. Adequate lighting (non-competition level) would be maintained after games to allow for safe exiting of the field.
[2] Marching band practices would not occur within 12 hours of each other. Practices could be extended in the event of postseason regional or national competitions, but not beyond December 31, except by permission of the Superintendent or designee. Marching band practice may be held during morning, afternoon and Saturday hours without stadium lights with no restriction.
[3] The one exception being Thanksgiving morning (Turkey Trot event, where sound equipment would be in use starting at 8:00 AM)
[4] CIF schedule shows the first day of practice as August 9, 2020 for fall sports.

Existing Noise Environment

The noise measurement survey completed near Mountain View High School is described below and summarized in Table 5 and Table 6.

The Mountain View High School campus is located west of State Route 85 (SR85), north of Oak Avenue, and south of Bryant Avenue at 3535 Truman Avenue in Mountain View. The school is in a residential area. Single-family residences are located on the east of the site, on the north across Bryant Avenue, on the south across Oak Avenue and on the west across Truman Avenue. Two churches are located to the southwest; Grace Community Covenant Church and Foothill Covenant Church.

Illingworth & Rodkin, Inc. performed a noise monitoring survey on Friday, October 5, 2018 to characterize the ambient noise levels at the site and in the project vicinity. This survey consisted of two attended short-term measurements (MV-1 and MV-2). An additional noise monitoring survey was performed on Friday, October 25, 2019 to characterize the ambient noise levels at the site and to measure noise at the site and in the project vicinity resulting from the Homecoming football game. This survey consisted of one long-term measurement (LT-1) and five short-term measurements (ST-1 through ST-5). The ambient noise environment in the area results primarily from vehicular traffic on the local street network. Intermittent general aviation aircraft and activities at the school also contribute to ambient noise levels. Noise monitoring locations are depicted in Figure 1.

Short-term noise measurements MV-1 and MV-2 were conducted on Friday, October 5, 2018 in several ten-minute intervals starting at 12:50 p.m. and concluding at 1:40 p.m. MV-1 was near the residence located at 3389 Brower Avenue, approximately 100 feet north of Bryant Avenue. This location was selected to characterize daytime ambient noise levels in the residential area located north of the school. The 10-minute average noise level measured at this location beginning at 12:50 p.m. was 54 dBA L_{eq}, and the 10-minute average noise level measured at this location beginning at 1:00 p.m. was 55 dBA L_{eq}. During the measurements, automobiles generated maximum noise levels ranging from 57 to 74 dBA L_{max} and an aircraft passing overhead produced a maximum noise level of 61 dBA L_{max}. Distant traffic on State Route 85 generated a steady background noise level of 46 to 47 dBA. MV-2 was located near the residence at 1701 Joel Way just east and south of the school. This location was selected to characterize daytime ambient noise levels in the residential area located to the east and south of the school. The 10-minute average noise level measured at this location beginning at 1:20 p.m. was 51 dBA L_{eq}, and the 10-minute average noise level measured at this location beginning at 1:30 p.m. was 48 dBA L_{eq}. During the measurements vehicles generated maximum noise levels ranging from 46 to 56 dBA $L_{max,}$ aircraft passing overhead produced a maximum noise levels of 56 to 62 dBA L_{max}, distant landscaping in the neighborhood measured 50 to 52 dBA L_{max}, and music from the school was audible but did not affect measured sound levels. Distant traffic on State Route 85 generated a steady background noise level of 46 to 47 dBA.

Short-term noise measurements ST-1 through ST-5 were conducted on Friday, October 25, 2019 in several ten-minute intervals starting at 7:00 p.m. and concluding at 9:00 p.m. These measurements took place during the Homecoming varsity football game. ST-1 was located at the east side of the site near the baseball field. This location was selected to characterize noise levels measured during the football game at the nearest residences to the east. The 10-minute average

noise level measured at this location beginning at 7:00 p.m. was 64 dBA L_{eq}, and the 10-minute average noise level measured at this location beginning at 7:10 p.m. was 65 dBA L_{eq}. During the measurements, crowd cheers and band performance generated maximum noise levels in the range of 71 to 77 dBA L_{max}. PA system announcements resulted in maximum noise levels of 62 to 69 dBA L_{max}.

ST-2 was made south of the football field in front of 1638 Oak Avenue. This location was selected to characterize noise levels measured during the football game at the nearest residences to the south. The 10-minute average noise level measured at this location beginning at 7:30 p.m. was 64 dBA L_{eq}, and the 10-minute average noise level measured at this location beginning at 7:40 p.m. was 65 dBA L_{eq}. During the measurements, crowd cheers and band performance generated maximum noise levels in the range of 70 to 74 dBA L_{max}. PA system announcements resulted in maximum noise levels of 68 to 71 dBA L_{max}. Local traffic generated maximum noise levels of 65 to 71 dBA L_{max}.

ST-3 was made west of the football field across Truman Avenue. This location was selected to characterize noise levels measured during the football game at the nearest residences to the west. The 10-minute average noise level measured at this location beginning at 8:00 p.m. was 66 dBA L_{eq}, and the 10-minute average noise level measured at this location beginning at 8:10 p.m. was 72 dBA L_{eq}. During the measurements, crowd cheers and band performance generated maximum noise levels in the range of 69 to 80 dBA L_{max}. PA system announcements resulted in maximum noise levels of 71 to 80 dBA L_{max}. An instance of speaker feedback resulted in a maximum noise level of 81 dBA L_{max}.

ST-4 was made northwest of the football field, across Truman Avenue near 1110 Bruckner Circle. This location was selected to characterize noise levels measured during the football game at residences to the north. The 10-minute average noise level measured at this location beginning at 8:30 p.m. was 57 dBA L_{eq}. During the measurement, crowd cheers and band performance generated maximum noise levels in the range of 59 to 64 dBA L_{max}. PA system announcements resulted in maximum noise levels of 60 to 64 dBA L_{max}.

ST-5 was made southwest of the football field near the corner of Truman Avenue and Awalt Court. This location was selected to characterize noise levels measured during the football game at residences to the south. The 10-minute average noise level measured at this location beginning at 8:50 p.m. was 58 dBA L_{eq}. During the measurement, crowd cheers generated maximum noise levels in the range of 53 to 56 dBA L_{max}. PA system announcements resulted in maximum noise levels of 55 to 61 dBA L_{max}. Local traffic generated maximum noise levels of 67 to 73 dBA L_{max}.

Long-term measurement LT-1 measured noise levels between Friday, October 25, 2019 and Friday, November 1, 2019. LT-1 was located at the southwest end of the football field. This location was selected to characterize ambient noise levels at the football field and record noise levels during the Homecoming game near the source.

FIGURE 1 Mountain View High School Measurement Locations

Source: Google Earth

TABLE 5 Summary of Short-Term Noise Measurement Data (dBA)

Location and Date	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}	Worst-hour Football Noise, L_{eq}[1]
MV-1A: 3389 Brower Avenue (10/5/2018, 12:50 p.m. - 1:00 p.m.)	69	64	58	48	45	54	-
MV-1B: 3389 Brower Avenue (10/5/2018, 1:00 p.m. - 1:10 p.m.)	74	65	58	49	46	55	-
MV-2A: 1701 Joel Way (10/5/2018, 1:20 p.m. - 1:30 p.m.)	63	59	52	50	49	51	-
MV-2B: 1701 Joel Way (10/5/2018, 1:30 p.m. - 1:40 p.m.)	52	52	50	47	46	48	-
ST-1A: East side of site near baseball field (10/25/2019, 7:00 p.m. - 7:10 p.m.)	75	74	68	58	55	64	64
ST-1B: East side of site near baseball field (10/25/2019, 7:10 p.m. - 7:20 p.m.)	77	75	69	59	56	65	65
ST-2A: 1638 Oak Avenue (10/25/2019, 7:30 p.m. - 7:40 p.m.)	74	72	68	61	58	64	65
ST-2B: 1638 Oak Avenue (10/25/2019, 7:40 p.m. - 7:50 p.m.)	74	73	70	61	59	65	66
ST-3A: Truman Avenue Residences (10/25/2019, 8:00 p.m. - 8:10 p.m.)	81	75	68	63	60	66	67
ST-3B: Truman Avenue Residences (10/25/2019, 8:10 p.m. - 8:20 p.m.)	82	80	76	68	61	72	71
ST-4: 1110 Bruckner Circle (10/25/2019, 8:30 p.m. - 8:40 p.m.)	64	64	60	55	52	57	58
ST-5: Truman Avenue and Awalt Court (10/25/2019, 8:50 p.m. - 9:00 p.m.)	74	68	62	54	50	58	62

[1] Calculated through comparison of short-term data to data measured at LT-1 during corresponding time intervals.

TABLE 6 Summary of Long-Term Noise Measurement Data (dBA)

Location and Date	Hourly-Average Noise Level, L_{eq}			DNL
	Daytime	Nighttime	Football Game	
LT-1: Southwest end of Mountain View High School football field (Friday, 10/25/2019 through Friday, 11/1/2019)	50 to 73	38 to 56	69 to 72	57 to 62

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to adjacent land uses.

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise and vibration resulting from the project:

1. **Temporary or Permanent Noise Increases in Excess of Established Standards.** A significant impact would be identified if project construction or operations would result in a substantial temporary or permanent increase in ambient noise levels at sensitive receivers in excess of the local noise standards contained in the Mountain View General Plan or Municipal Code, as follows:

    - Temporary Noise Increase. A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. Hourly average noise levels exceeding 60 dBA L_{eq} at the property lines shared with residential land uses, and the ambient by at least 5 dBA L_{eq}, for a period of more than one year would constitute a significant temporary noise increase at adjacent residential land uses.

    - Operational Noise in Excess of Standards. A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code.

    - Permanent Noise Increase. A significant impact would be identified if traffic or school activity noise generated by the project would substantially increase noise levels at sensitive receivers in the vicinity. A substantial increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

2. **Generation of Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would generate excessive vibration levels. Groundborne vibration levels exceeding 0.3 in/sec PPV would be considered excessive as such levels would have the potential to result in cosmetic damage to buildings.

Impact 1: **Temporary or Permanent Noise Increases in Excess of Established Standards.** Project construction and traffic would not generate noise levels that exceed the applicable noise thresholds or result in a substantial temporary or permanent level increase at existing noise-sensitive land uses in the project vicinity. **This is a less-than-significant impact**.

A significant noise impact would occur if construction, traffic, or activities generated by the project would substantially increase noise levels at sensitive receptors in the project vicinity.

Temporary Noise Increases from Project Construction

Section 8.70.1 of the City of Mountain View Municipal Code establishes allowable hours of construction between 7:00 a.m. and 6:00 p.m. Monday through Friday unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends or holidays. This analysis assumes that construction activities will occur only during the allowable hours or modified hours as permitted by the code.

Construction activities associated with the Project would occur over a period of a few weeks. Installation of the proposed lighting and audio system would require minor excavation of the field to construct the pole foundations, trenching and boring for electrical conduit installation, installation via hydraulic crane of the lighting poles, mounting of the luminaires, and restoration of disturbed surfaces including pavement and landscaping that was removed during excavation and trenching. Construction equipment to be used would include an excavator, boring machine, concrete truck and pump, and a crane.

Typical noise levels for different construction equipment at a distance of 50 feet are shown in Table 7. Table 7 levels are consistent with construction noise levels calculated for the project in the Federal Highway Administration (FHWA) Roadway Construction Noise Model, including the anticipated equipment that would be used for each phase of the project. As indicated in Table 7, excavators, cranes, boring jack power units, and concrete pumps would be anticipated to generate noise level of 80 to 85 dBA L_{max} at a distance of 50 feet. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain can provide an additional 5 to 10 dBA noise reduction at distant receptors.

TABLE 7 Construction Equipment, 50-foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes: [1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

Typically, small construction projects do not generate significant noise impacts when standard construction best management practices are enforced at the project site and when the duration of the noise generating construction period is limited to 12 months or less. Construction noises associated with projects of this type are disturbances that are necessary for the construction or repair of buildings and structures in urban areas. However, as construction will at times be within 75 feet of nearby sensitive receptors and result in temporarily elevated noise levels, the following best practices should be followed:

- Construction staging areas shall be established at locations that will create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.

- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Unnecessary idling of internal combustion engines should be strictly prohibited.

- Locate stationary noise-generating equipment, such as air compressors or portable power generators, as far as possible from sensitive receptors. If they must be located near receptors, adequate muffling (with barriers or enclosures where feasible and appropriate) shall be used to reduce noise levels at the adjacent sensitive receptors.

- Utilize "quiet" air compressors and other stationary noise sources where technology exists.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.

With implementation of the above best practices and given that construction is proposed only during allowable hours, this is a **less-than-significant** impact.

Permanent Noise Increases from Project Traffic

A significant permanent noise increase would occur if traffic generated by the project would substantially increase noise levels at sensitive receptors in the project vicinity. A substantial increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

Based on the transportation impact analysis conducted by Hexagon Transportation Consultants, Inc.[1], p.m. peak hour traffic noise increases as a result of the project were calculated at eight intersections near the site. The additional traffic contributed by the project would result in noise increases of 0 to 1 dB along all affected roadway segments except for the segment of Oak Avenue east of Truman Avenue, where a 2 dB increase is expected. As this increase is only anticipated for a select few evening hours on nights of events with the highest attendance, the overall traffic noise level increase as a result of the project would be less than 1 dBA L_{dn}. The proposed project would

1 Mountain View High School Field Lighting Project, Hexagon Transportation Consultants, February 2020

not result in traffic noise increases of 3 dBA DNL or more on the surrounding roadway network. This is a **less-than-significant** impact.

Permanent Noise Increases from On-Site Operational Noise

With the addition of permanent lights, a limited number of currently occurring sports games and practices, marching band performances and practices, and special events may shift from daytime to nighttime hours. Sports games would typically conclude by 8:30 p.m. with football games concluding by 10:00 p.m. at the latest. Attendance for Homecoming and typical football games is anticipated to increase after the installation of permanent field lighting. The most attendees the high school expects to attract is 2,200 people, up from 2,000 people, at the Homecoming football game, which already occurs on site using temporary lights. An average crowd for a football game is expected to be about 1,500 people, up from 1,000 people, and a minimum crowd for other sporting events would be up to 500 people. Mountain View Los Altos Union High School District Board Policy and Regulation 7325 guide the allowed uses for stadium lighting and PA systems and are summarized in Table 4.

Football Games

Home football games would be expected to generate the highest noise levels at residential land uses in the site vicinity, primarily because of the number of participants and spectators. The nearest noise sensitive receptors include residences to the west across Truman Avenue (represented by ST-3), residences to the south across Oak Avenue (represented by ST-2 and LT-1), and residences to the east of the field along Harwalt Drive (represented by ST-1). Based on the noise monitoring survey, the varsity Homecoming football game resulted in worst-hour average noise levels of 67 to 71 dBA L_{eq} at the nearest residences to the west, with maximum noise levels in the range of 71 to 82 dBA L_{max} (see ST-3). The nearest residences to the south of the field were exposed to hourly average noise levels of 65 to 66 dBA L_{eq}, with maximum noise levels in the range of 68 to 74 dBA L_{max} (see ST-2). The nearest residences to the east of the field were exposed to hourly average noise levels of 64 to 65 dBA L_{eq}, with maximum noise levels in the range of 71 to 77 dBA L_{max}. At residences further north and northwest, football activity noise was audible, but similar in level to other ambient noise sources. There was an attendance of approximately 2,000 people at this game.

Based on measurements made at various high school football games in the Bay Area[2,3,4], the variation in spectator noise primarily depends upon the attendance and level of excitement generated by the game. Otherwise, noise levels generated by the PA or the referees' whistles would be about the same regardless of the number of people in attendance. Table 8 summarizes hourly average noise levels calculated at the nearest receivers, based on the number of spectators and the

2 Santa Teresa High School Stadium Lighting Project, Environmental Noise Assessment, Illingworth & Rodkin, Inc., September 12, 2013.

3 Lynbrook High School Field Improvements and Lighting Project Environmental Noise Assessment, Illingworth & Rodkin, Inc., June 3, 2010.

4 Silver Creek High School Sports Lighting Project Environmental Noise Assessment, Prepared by Illingworth & Rodkin, Inc., September 9, 2013.

results of the noise monitoring survey. The results shown for residences to the north take into account shielding provided by intervening structures.

TABLE 8 Worst Hour Noise Levels during Football Events (L_{eq}, dBA)

Number of Spectators	Residences to West	Residences to South	Residences to East	Residences to Northwest	Residences to North, Shielded
1,500 (Typical)	70	65	63	57	52
2,200 (Homecoming)[1]	71	66	64	58	53

[1] Currently being hosted at Mountain View High School using temporary lights.

Ambient hourly average noise levels between 7:00 p.m. and 10:00 p.m. on non-game nights currently range from 48 to 58 dBA L_{eq} at residences to the south along Oak Avenue and to the west along Truman Avenue. The Homecoming football game is already being hosted at Mountain View High School using temporary lights and would be considered an existing use of the facility. As shown in Table 8, typical football games would be anticipated to generate worst-hour noise levels of about 70 dBA L_{eq} at the nearest residences to the west, 65 dBA L_{eq} at the nearest residences to the south, 63 dBA L_{eq} at the nearest residences to the east, 57 dBA L_{eq} at the nearest residences to the northwest, and 52 dBA L_{eq} at the nearest residences to the north. The closest residences to the west and south could be exposed to noise levels during typical football games that would exceed ambient noise levels by as much as 22 dBA L_{eq}. Residences to the east would experience noise levels about 15 dBA L_{eq} higher than ambient levels. Residences to the northwest would experience noise levels about 9 dBA L_{eq} above ambient levels. Residences to the north would experience noise levels about 4 dBA L_{eq} above ambient levels.

Table 9 shows the calculated DNL noise levels during typical and homecoming attendance football games at surrounding residences. DNL levels in Table 9 were calculated based on the worst hour noise levels in Table 8. Measurements conducted by Illingworth & Rodkin, Inc. at nearby Los Altos High School on Saturday, September 28 indicated that junior varsity football games resulted in noise levels 2 dB lower than the varsity football games that followed them. The levels in Table 9 assume three sustained hours of junior varsity play at levels 2 dB below those in Table 8, followed by three hours of sustained varsity play at the levels equal to those in Table 8.

TABLE 9 DNL Resulting from Football Events between 4:00 p.m. and 10:00 p.m. (dBA)

Number of Spectators	Residences to West	Residences to South	Residences to East	Residences to Northwest	Residences to North, Shielded
1,500 (Typical)	63	58	56	50	45
2,200 (Homecoming)[1]	64	59	57	51	46

[1] Currently being hosted at Mountain View High School using temporary lights.

As shown in Table 9, noise levels resulting from typical attendance games occurring continuously between the hours of 7:00 p.m. and 10:00 p.m. would exceed 55 dBA DNL at the closest residences to the west, south, and east of the field.

Mountain View High School currently plays all of its football games at the school and during daytime hours with the exception of two to five games played in the evening using temporary field lighting. After installation of permanent field lighting, football games would shift from daytime to evening hours. No games are to continue past 10:00 p.m. The increase in noise levels as a result of installation of permanent field lighting will primarily result from the increase in attendance. Due to the shift of football games to evening hours, attendance at typical games is expected to increase from 1,000 to 1,500 people, and attendance at homecoming games from 2,000 to 2,200 people. This would result in increases of 2 dBA and less than 1 dBA, respectively. These increases are reflected in the calculated noise levels shown in Table 9. As football games are already being played at the site and attendance increases will not result in substantial noise increases (3 dBA or greater) at nearby sensitive receptors, the installation of permanent field lights for evening football games would not result in a significant noise impact.

Other Sports Games, Practices, and Events

Noise levels generated by field hockey, track meets, soccer, and lacrosse games are generally limited to whistles and some cheering. These noise levels would not be as prominent as the noise levels generated by football games. Based on noise monitoring of soccer games at other high schools[5,6], whistles and cheering would be anticipated to generate maximum noise levels of about 58 to 63 dBA L_{max} at residences adjoining the field. Hourly average noise levels during field hockey, soccer, and lacrosse events would be anticipated to be about 48 dBA L_{eq} at the closest residences to the west, located about 280 feet from the center of the field. Evening field hockey, track meets, soccer, and lacrosse events would not substantially increase noise levels at nearby sensitive receptors (increase would be less than 1 dBA DNL).

The proposed field lighting would allow marching band practices to occur during evening hours. As outlined in Table 4, marching band practices would occur on two weeknights per week between August and November. One practice would conclude by 8:00 p.m. and the other practice would conclude by 6:30 p.m. In 2012, Illingworth & Rodkin, Inc. measured marching band practice noise levels at Santa Teresa High School in San José, California[6]. At a distance of approximately 570 feet, the hourly average noise level measured was 61 dBA L_{eq}, and the average maximum noise level measured throughout the practice was 74 dBA L_{max}. This corresponds to an hourly average noise level of 67 dBA L_{eq} and maximum noise level of 80 dBA L_{max} at the nearest residence to the west. The resulting DNL from one hour and fifteen minutes of marching band practice would be 55 dBA DNL. This would not substantially increase day-night average noise levels at nearby sensitive receptors.

[5] Silver Creek High School Sports Lighting Project Environmental Noise Assessment, Prepared by Illingworth & Rodkin, Inc., September 9, 2013.

[6] Santa Teresa High School Sports Lighting Project Environmental Noise Assessment, Prepared by Illingworth & Rodkin, Inc., September 12, 2013.

Field lights would be used for commencement and up to three special evening events per year, concluding by 9:00 p.m. Attendance for these events would vary by event, with the largest attendance anticipated for commencement. Noise levels resulting from events would depend on the nature of the event and their attendance. With attendance levels similar to a typical football game, but a duration shorter than that of the combined varsity and junior varsity games used for calculations in Table 9, commencement would result in noise levels approximately 2 dBA below those of a typical football game. Following the attendance increases proposed for a typical football game, increased commencement attendance would result in a noise level increase of 2 dBA DNL. With increased attendance, other special events would be similar in noise level to non-football sporting events such as soccer and field hockey and would not substantially increase noise levels at nearby sensitive receptors (increase would be less than 1 dBA DNL).

In addition to field lighting, the project also includes an audio upgrade for the field. The PA system would include a distributed speaker system, with multiple speakers that would be angled down towards the field. The PA system proposed by the project is the standard type used at high school sports fields that are similar in size to the proposed project and would be used during games and other events, such as commencement. Normally, a distributed sound system is equivalent or superior to a single- or dual-speaker system when considering potential community noise impacts. PA announcements would be similar to levels generated during existing football games with maximum instantaneous noise levels ranging from about 65 to 75 dBA L_{max} at the nearest residences. The PA systems would be used less frequently and not be allowed for running commentary during events such as lacrosse, soccer, field hockey, and track meets. Typically, PA announcements at such events are limited to announcements, warm-ups, and to announce halftime and the end of the game. The intermittent announcements are taken into account in the calculations provided in Tables 8 and 9. The new PA systems would be designed to reduce spillover into the adjacent residential areas, and to conform to exterior noise limits set in the City of Mountain View Municipal Code and General Plan, which prohibit noise levels from operation of stationary noise sources from exceeding 55 dBA at the nearest residential land use. This is a **less-than-significant** impact.

Mitigation Measure 1: None required.

Impact 2: **Generation of Excessive Groundborne Vibration due to Construction.** Construction-related vibration levels would not exceed 0.3 in/sec PPV at the nearest structures. **This is a less-than-significant impact.**

Installation of the proposed lighting and audio system would require minor excavation of the field to construct pole foundations, trenching and boring for electrical conduit installation, installation via hydraulic crane of the lighting poles, mounting of the luminaires, and restoration of disturbed surfaces including pavement and landscaping that was removed during excavation and trenching. Construction equipment to be used would include an excavator, boring machine, concrete truck and pump, and a crane. The closes structures to the project site are residences located about 75 feet to the south, and a church and residences located about 100 feet to the west. Based on vibration levels presented in the Federal Transit Administration Manual for typical construction equipment[7],

7 Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018.

equipment associated with project construction would be anticipated to generate vibration levels of 0.003 to 0.08 in/sec PPV at a distance of 25 feet. Vibration levels at a distance of 75 feet were calculated to be 0.001 to 0.06 in/sec PPV, and 0.001 to 0.05 in/sec PPV at a distance of 100 feet. Construction vibration could, at times, be perceptible to occupants, but would not be anticipated to cause cosmetic or structural damage to the nearest buildings and would not be considered excessive. As construction moves away from the southern and western property lines, vibration levels would be even lower. This is a **less-than-significant** impact.

Mitigation Measure 2: **None required.**

MOUNTAIN VIEW HIGH SCHOOL FIELD LIGHTING PROJECT NOISE APPENDIX

Mountain View, California

March 9, 2020

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FIGURE A1 Noise Levels at Measurement Site LT-1 on Friday, October 25, 2019

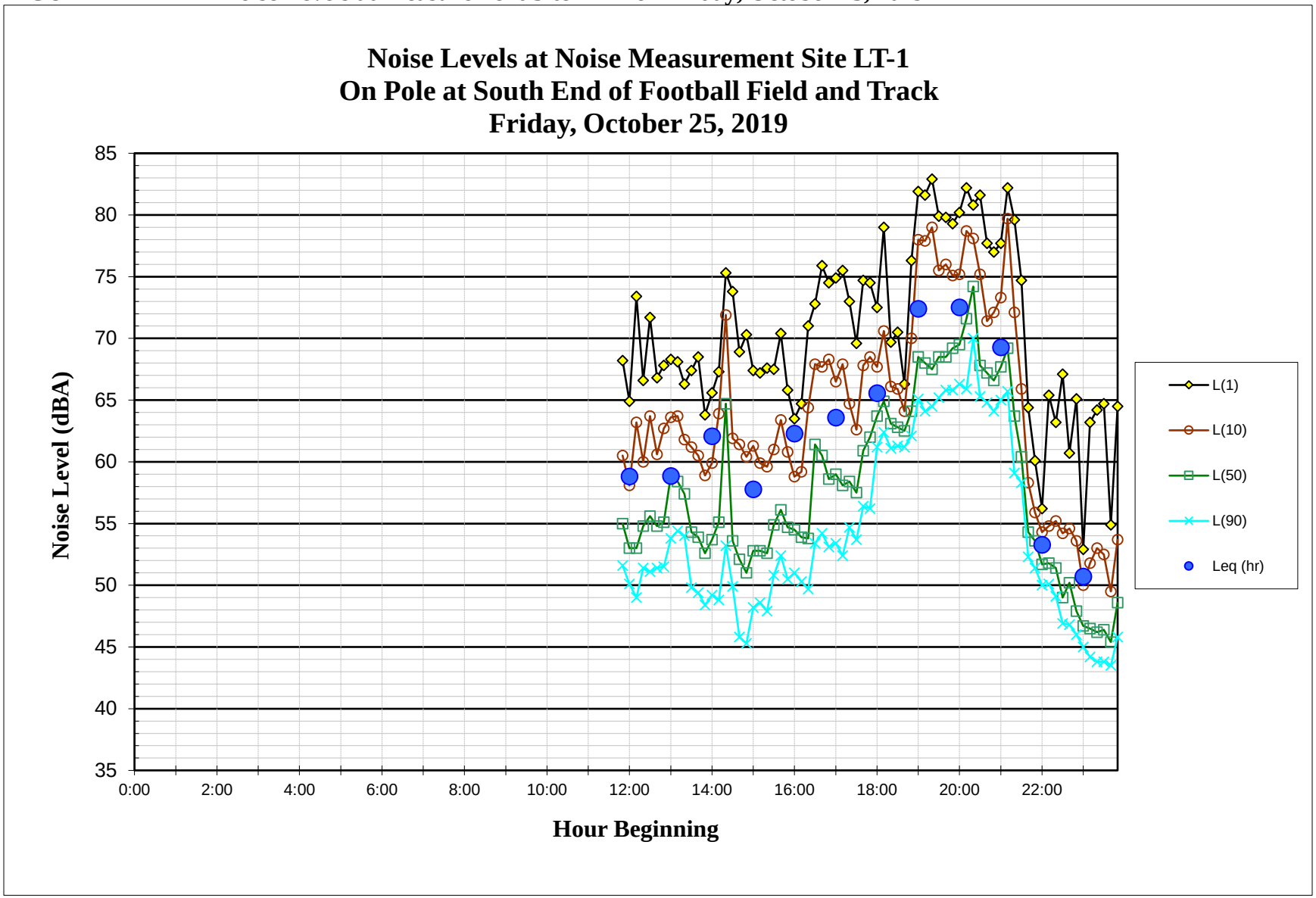

FIGURE A2 Noise Levels at Measurement Site LT-1 on Saturday, October 26, 2019

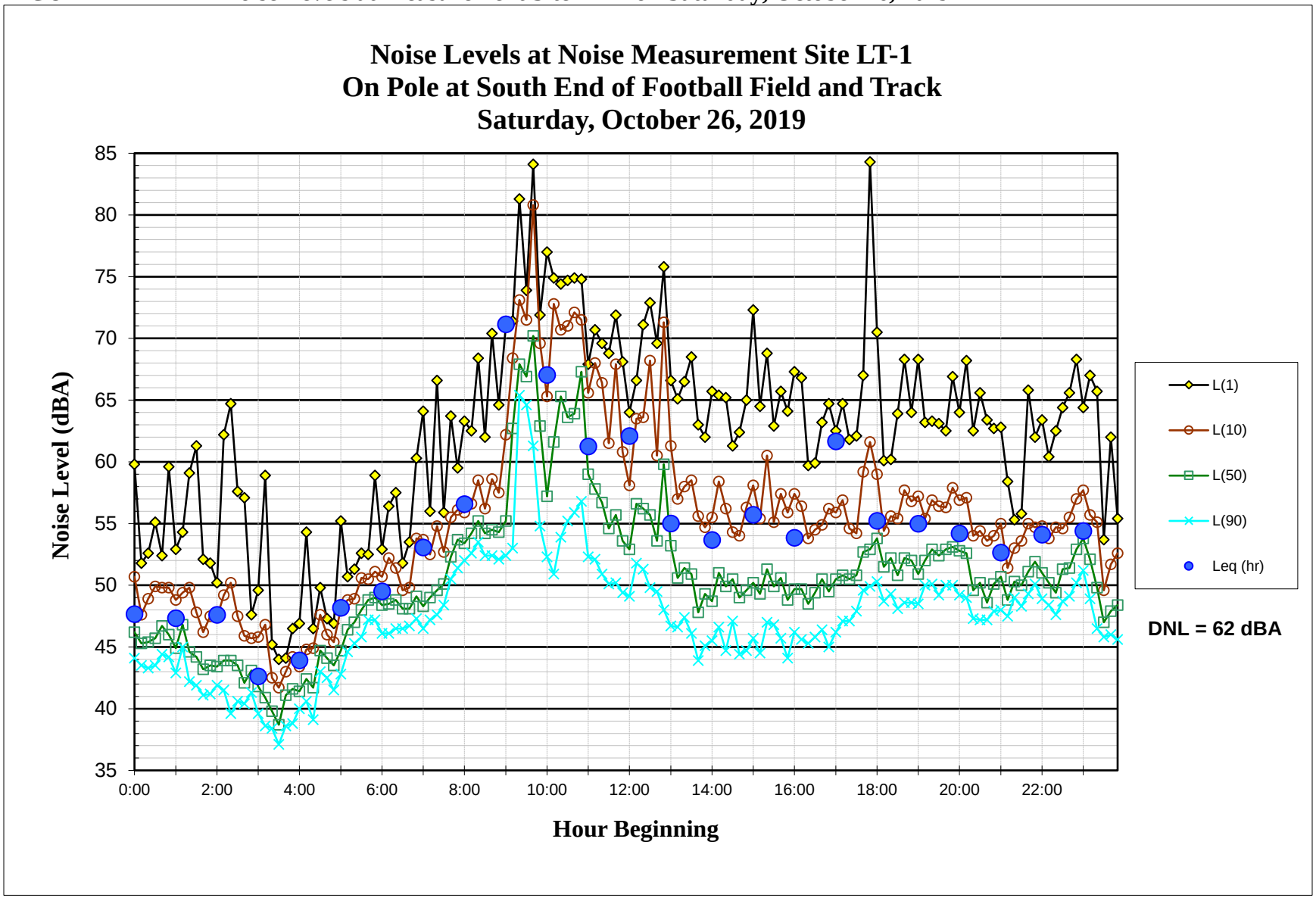

FIGURE A3 Noise Levels at Measurement Site LT-1 on Sunday, October 27, 2019

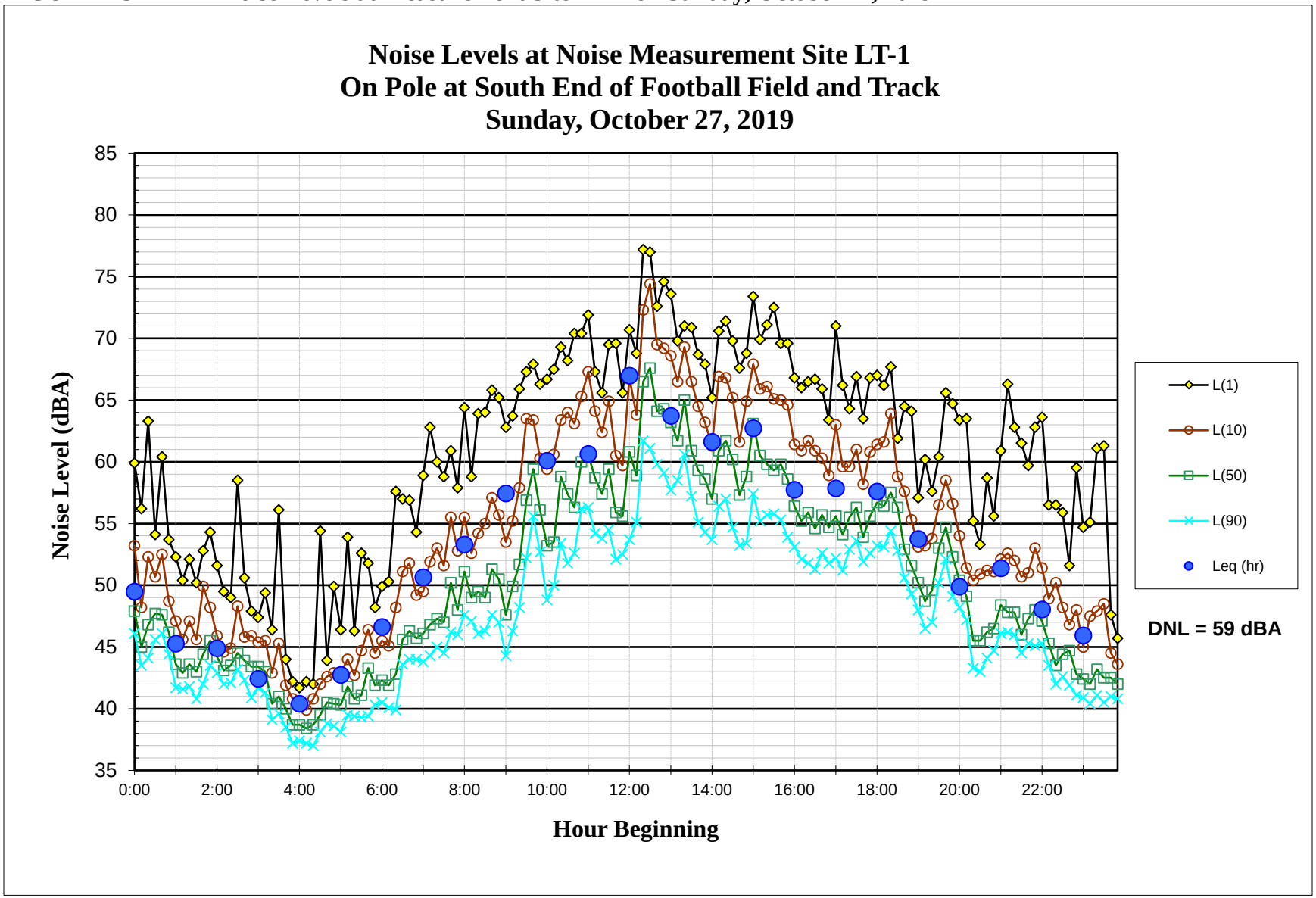

FIGURE A4 Noise Levels at Measurement Site LT-1 on Monday, October 28, 2019

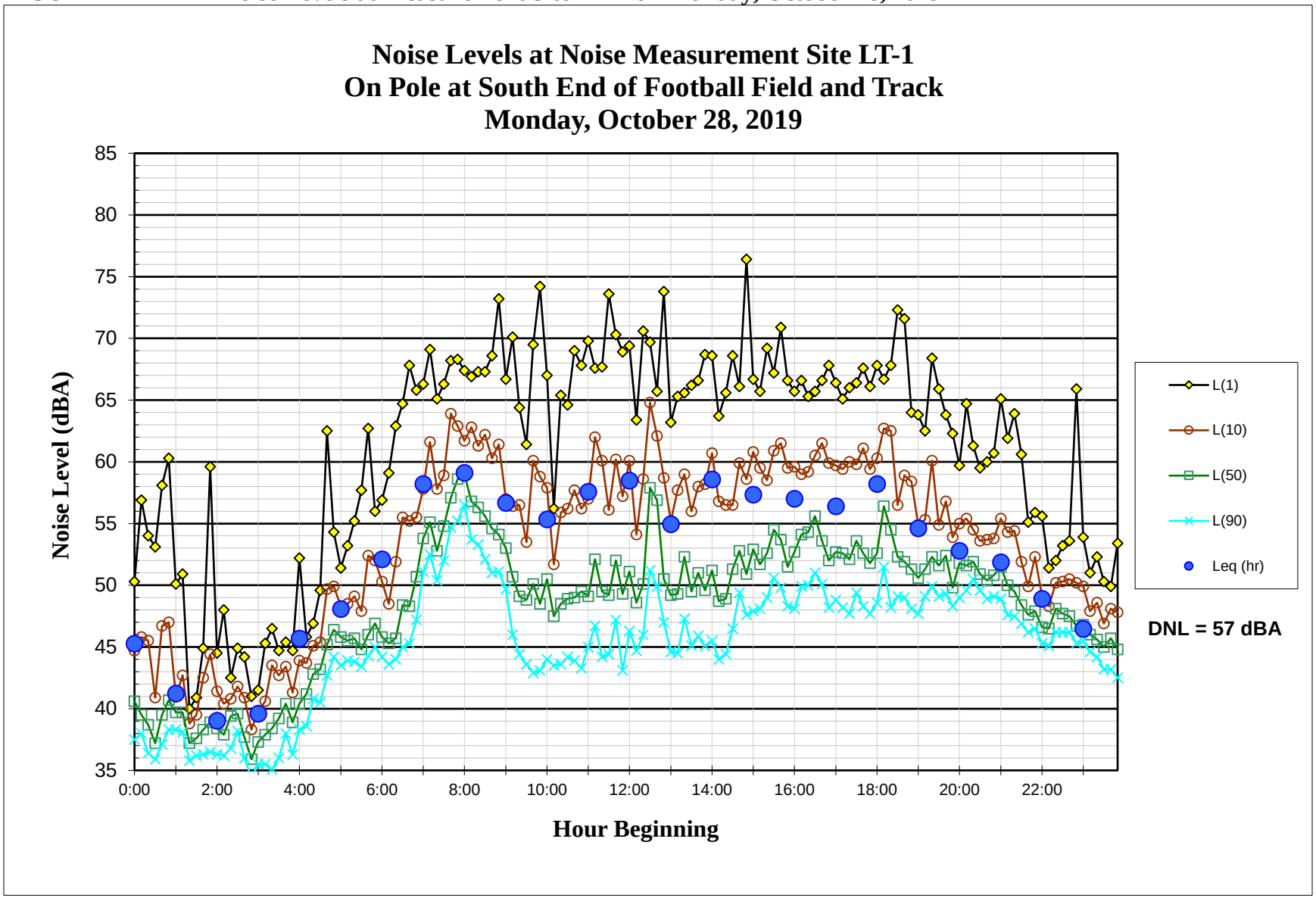

FIGURE A5 Noise Levels at Measurement Site LT-1 on Tuesday, October 29, 2019

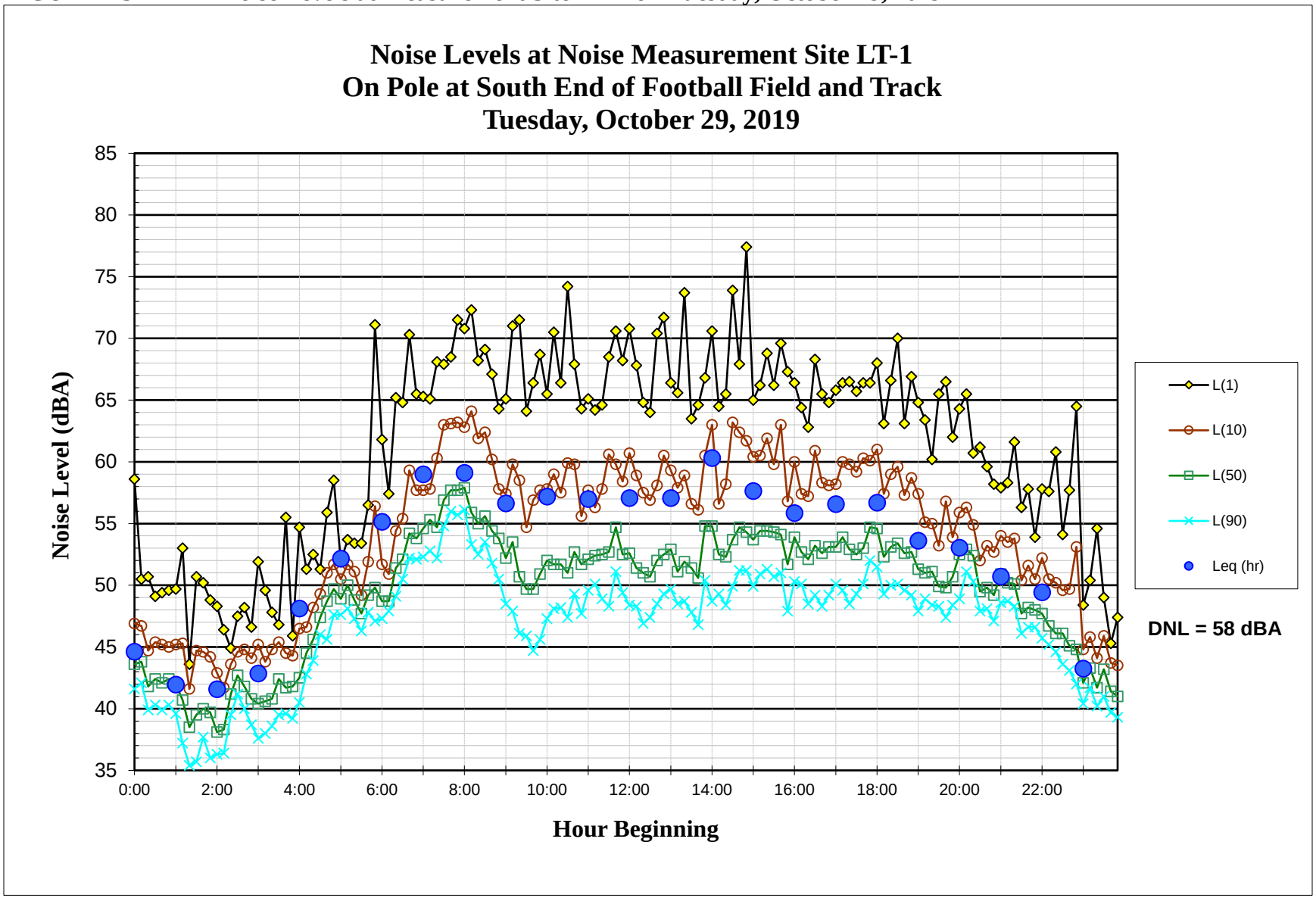

FIGURE A6 Noise Levels at Measurement Site LT-1 on Wednesday, October 30, 2019

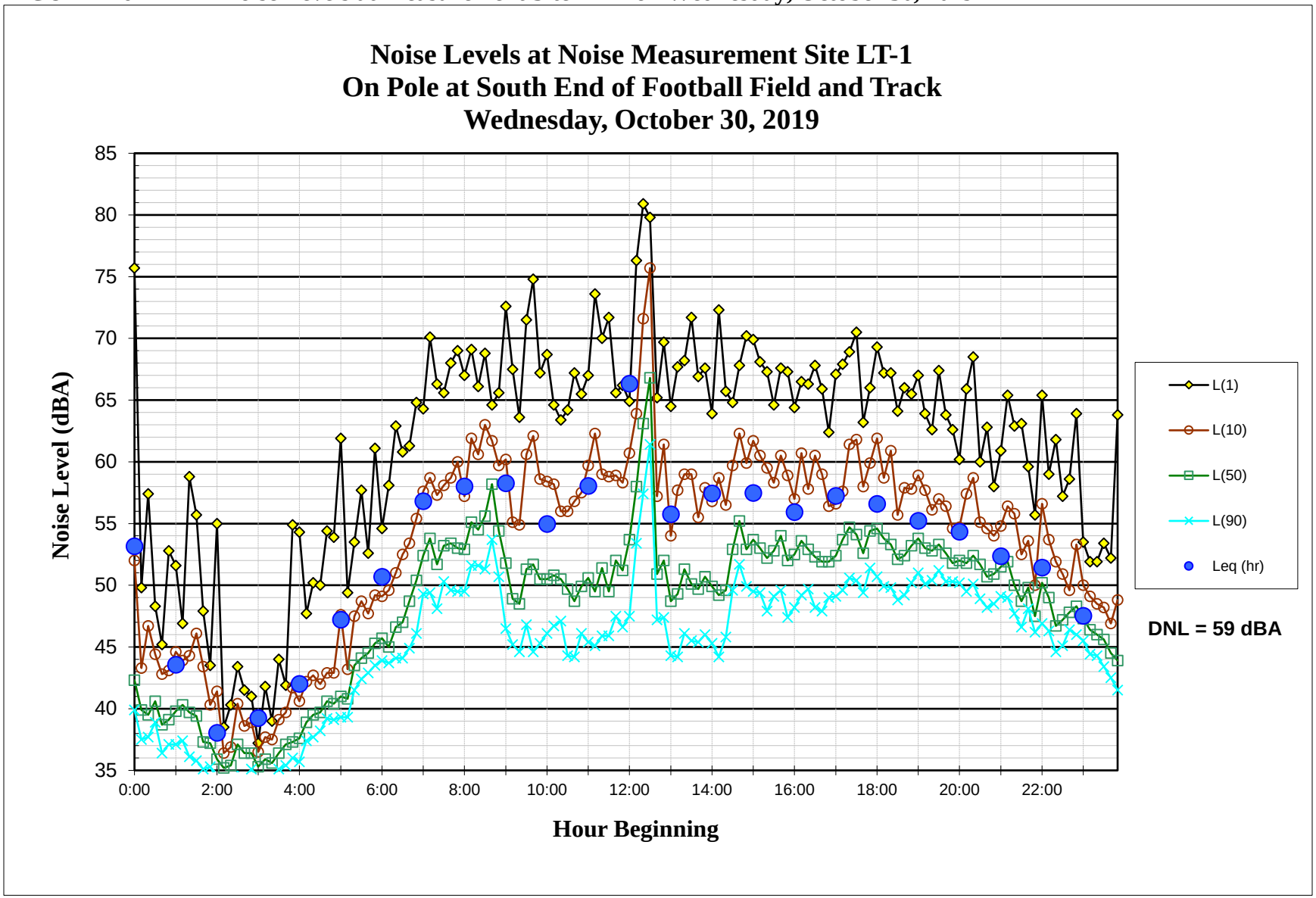

FIGURE A7 Noise Levels at Measurement Site LT-1 on Thursday, October 31, 2019

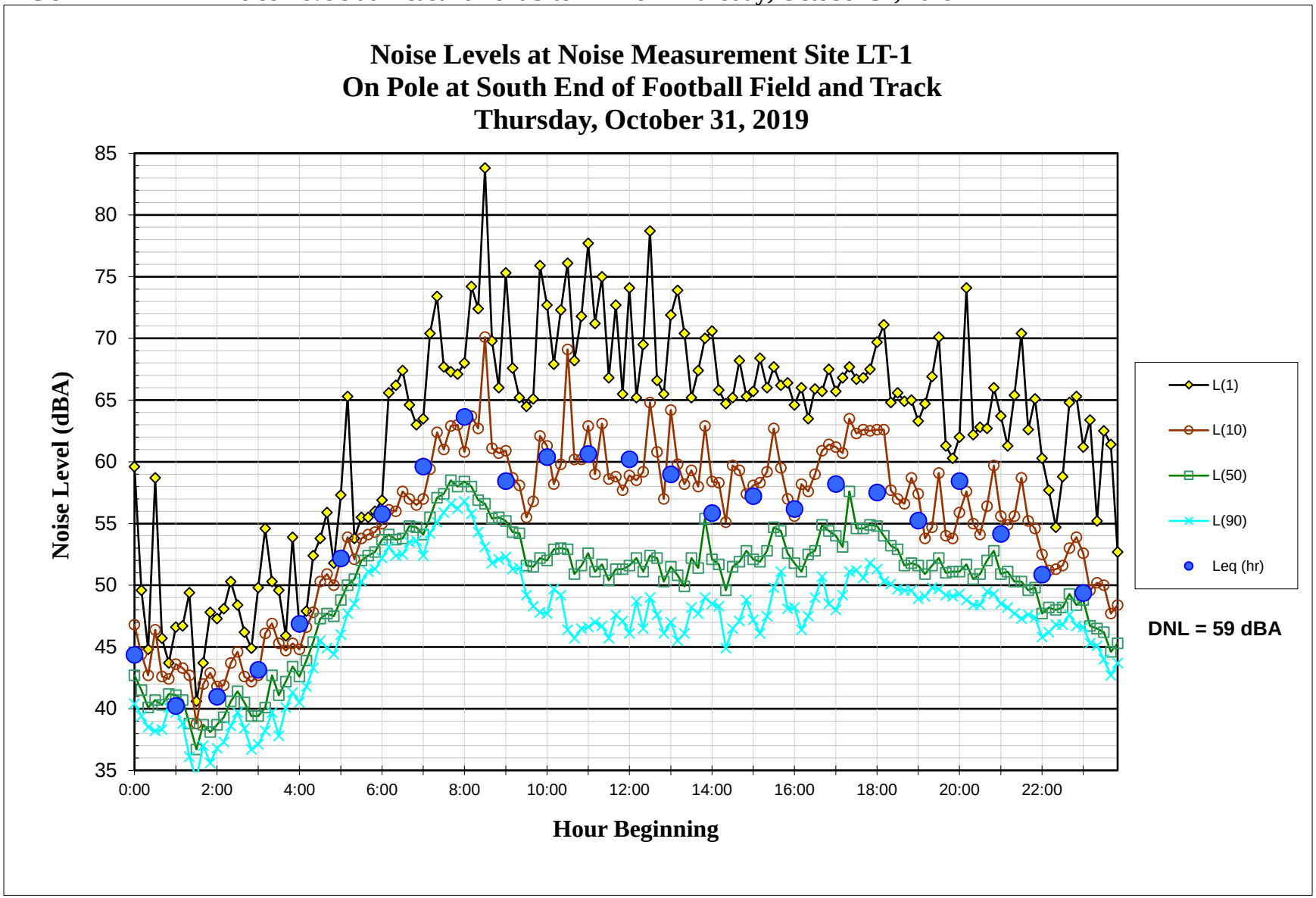

FIGURE A8 Noise Levels at Measurement Site LT-1 on Friday, November 1, 2019